REMARKS

Independent claim 1 has been amended to specify that the cathode includes between 92 and 82% manganese dioxide by weight. Support for the amendments can be found in original claim 1 and in dependent claim 11. Claim 11 has been cancelled. Independent claim 1 is now substantially identical in scope to the now-cancelled formerly dependent claim 11. Independent claim 31 also has been amended to specify that the cathode includes between 92 and 82% manganese dioxide by weight.

Page 2, line 20 of the Specification has been amended to correct for a typographical error. Support for this amendment exists within this paragraph itself and in original claim 20. A range of about 500 nanometers to about 200,000 nanometers is not an example of a range that is less than about 20,000 nanometers, thus the original recitation is clearly the result of a typo.

No new matter has been added.

Claims 1, 9, 10, 19, 31, 33, and 57 were rejected under 35 U.S.C. § 103(a) over Friend, EP 0 962 997 A1, ("Friend") in view of Adams, U.S. Pat. 4,177,157 ("Adams"). Claims 11 and 12, however, were rejected under 35 U.S.C. § 103(a) over Friend in view of Adams, and further in view of Anderson, U.S. Pat. 4,948,484 ("Anderson"). Applicants request that the rejection be reconsidered and withdrawn.

Applicants will focus the discussion on claim 1 because every claim includes the limitations included in claim 1, including independent claims 31 and 35. Claim 1 relates to primary alkaline batters having a cathode including between 92 and 82% manganese dioxide by weight and 6%-10% of carbon fibers by weight, an anode including zinc, and an alkaline electrolyte. This is a specific type of battery having specific design criteria.

Friend discloses carbon fibers that can be used in various types of batteries, including alkaline batteries having a cathode including manganese dioxide and an anode including zinc, and an alkaline electrolyte. Friend discloses specific examples of cathodes having between 4.02% and 5.14% of the carbon fiber by weight (see Examples I, II, and III in Table II in paragraph 39). The specific examples of cathodes disclosed by Friend have between 53.07% and 51.24% by weight manganese dioxide (see Examples I, II, and III in Table II in paragraph 39).

Friend fails to disclose or suggest the substantially higher amounts of manganese dioxide or of carbon fiber as recited in claim 1.

In an attempt to cure these deficiencies in Friend, the Examiner turns to Adams and Anderson, using hindsight, in an attempt to reconstruct the claimed elements without providing proper motivation for the combination of Friend, Adams, and Anderson. The Examiner also improperly relies on the case law of *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980), in an attempt sidestep the Examiner's burden of showing that the invention as a whole (including each claimed element) is known or would have been obvious to one having ordinary skill in the art at the time of invention. The following will address why there is insufficient motivation to combine the teachings of Friend, Adams, and Anderson in the method suggested by the Examiner and further explain how the Examiner is misapplying the ruling in *In re Boesch*.

The combination of Adams with Friend is improper because both Friend and Adams teach significantly different battery compositions and because the alteration of Friend to include a mixture of powdered and fiber-form graphite undermines the fundamental teaching of Friend, namely the use of carbon microfibers as the electrically conductive material.

Adams is primarily directed towards PTFE-bound electrodes for alkaline storage batteries using nickel hydroxide as the electrochemically reducible cathode material, a material with different electrical properties than the manganese dioxide taught by Friend. Adams focuses primarily on "coagulating PTFE particles" that act as a binder in forming the cathode. Adams merely mentions that "conductive diluents" such as graphite may be included to the electrode because the nickel hydroxide is not inherently conductive. *See* Adams, col. 4, lines 20-25. Adams says the graphite can be in the form of powder and/or fibers, and that:

> The total graphite content of a nickel electrode, for example, advantageously comprises up to about 30% by weight of the dry filter cake with about 23%-30% being preferred. The graphite therein is preferably in both the powdered and fibrous form (i.e. about 0.5 mm long), there being about half again as much powdered graphite (i.e. by weight) as there is fibrous graphite, though this can vary considerably.

See id. at lines 25-36.

The Examiner contends that a person of ordinary skill in the art would have been motivated to raise the amount of carbon fibers in Friend's manganese dioxide cathode to 6%-

10% by weight based on the quantity of carbon (graphite) fibers used by Adams in his nickel hydroxide electrode. The Examiner, however, has not provided a sufficient motivation for substituting the carbon additive of Adams for carbon microfibers in Friend. In the Office Action dated July 28, 2006, the Examiner contends that the teaching of Adams does apply to manganese dioxide by referring to column 1, line 10 of Adams, which states that the disclosed invention "is useful for all of the popular alkaline storage battery electrodes (e.g. zinc, cadmium, nickel, silver etc.)." The Examiner's argument fails to consider that the substance of the Adams disclosure is not directed towards the inclusion of carbon material but rather directed towards the production of PTFE-bound electrodes. The Applicants concede that Adams contemplates the use of other popular alkaline storage battery electrode materials in PTFE-bound electrodes, but the Applicants object to the suggestion that Adams suggests that the amount of carbon additive suggested for a nickel electrode is applicable to any popular alkaline storage battery electrode material. Column 4, lines 28-31 of Adams clearly teach an exemplary amount of carbon additive specifically for "a nickel electrode." Adams, col. 4, lines 28-31.

Also in the Office Action dated July 28, 2006, the Examiner claims that one having ordinary skill in the art at the time of invention would have found it obvious to modify the teachings of Friend by Adams in order "to achieve *greater* conductivity." One having ordinary skill in the art at the time of invention, however, would be unlikely to believe that the substitution of the carbon material of Adams for the carbon material of Friend would result in greater conductivity, given that Friend teaches a specific carbon microfiber that yields excellent conductivity while Adams offhandedly mentions that a mixture of powdered and fibrous graphite would improve conductivity. To the extent the Examiner cites Adams for the mere suggestion that more carbon material could be used, the mere possibility of using extra fibrous graphite material does not make doing so obvious. The Applicants do not dispute that it would have been possible to increase the amount of carbon material in the Friend cathode at the time of invention, but the mere possibility does not provide proper motivation for one having ordinary skill in the art to modify the teachings of Friend. As the federal courts have said many times, "obvious to try is not the standard of § 103." *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977).

The combination of Anderson with Friend is also improper because Anderson does not teach or suggest any reason for one having ordinary skill in the art at the time of invention to

drastically increase the amount of manganese dioxide in the Friend battery from the disclosed range of between 51.24 and 53.07% to the claimed range of between 92 and 82%. Anderson's disclosure relates primarily to "a process for treating electrolytic manganese dioxide" wherein "a mixture of an electrolytic manganese dioxide, carbon and a strong base electrolyte solution . . . is subjected to electrochemical oxidation in the presence of further strong base electrolyte solution while maintaining the mixture under anodic conditions." Anderson, col. 2, lines 10-19. Anderson does disclose a very broad range of ratios of manganese dioxide to carbon material "from 0.33:1 to about 12:1," which the Examiner seems to rely upon in arguing that Anderson discloses a range of between 25 and 92% manganese dioxide. *See* Anderson, col. 3, lines 12-25; Office Action dated 12/02/2003, page 3, lines 11-15. The excessively large range of ratios of manganese dioxide to carbon material, however, does not specifically address the weight percentage of manganese dioxide in the cathode because Friend teaches the inclusion of other materials into the cathode. *See* Friend, Table II. Anderson includes no teaching or suggestion that would motivate one having ordinary skill in the art at the time of invention to eliminate the other cathode components disclosed in Friend. Again, the mere possibility of a combination does not make that combination obvious to one having ordinary skill in the art.

In further support of the combination of Anderson with Friend, the Examiner misstates the ruling in the case of *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980), asserting that absent the showing of unexpected results "that the weight percentage of the active material is an optimizable parameter for a result-effective variable." *Id.*; Office Action dated 12/02/2003, page 3, lines 9-19. The Examiner states that because the percentage of cathode active material directly affects the battery's discharge capacity, "a skilled artisan" would find it obvious to optimize the weight percentage of the cathode active material. Office Action dated 12/02/2003, page 3, lines 17-19. *In re Boesch*, however, involved a composition where each component percentage range overlapped each component range taught by each of the two prior art references, Lamb and Pohlman et al. Furthermore, each range taught by Lamb and Pohlman et al. was sufficiently precise and nearly identical to the claimed ranges by Boesch such that Boesch was attempting to claim an alloy that was nearly identical to the alloys taught by Lamb and Pohlman et al. individually. In the present application, the Examiner is attempting to misuse the case of *In re Boesch* to improperly reject the battery composition of claim 1 that is entirely

different from and superior to the battery compositions disclosed by Friend, Adams, or Anderson.

Metals	In re Boesch Claim % range	Lamb % range	Pohlman et al. % range
Aluminum	4.0 – 4.7	4.0 – 5.4	4.2 – 4.6
Boron	0.005 – 0.03	0.003 – 0.1	0.025 – 0.035
Carbon	0.0 – 0.18	0.01 – 0.2	0.04 – 0.07
Chromium	13.7 – 15.3	14.0 – 16.0	14.5 – 15.5
Cobalt	14.2 – 19.0	14.0 – 25.0	14.5 – 15.5
Iron	0.0 – 4.0		
Molybdenum	3.8 – 4.8	3.0 – 5.5	4.5 – 5.5
Titanium	3.0 – 3.7	3.0 – 4.6	3.3 – 3.7
Zirconium		0.01 – 0.2	

Id., 617 F.2d at 273-74.

It is only in this case where an individual reference teaches or suggests overlapping ranges for each component, or at least sufficiently close ranges for each component, of a claimed composition "that the prior art would have suggested 'the kind of experimentation necessary to achieve the claimed composition.'" *See e.g., id.*, 617 F.2d at 276. In the present application, none of the references (Friend, Adams, or Anderson) individually teach or suggest ranges that come even close to the claimed ranges of components in claim 1. Friend both fails to teach a range that overlaps with the claimed range of carbon fibers and fails to teach a manganese dioxide percentage that is even close to the percentage of manganese dioxide claimed. The secondary references of Adams and Anderson further fail to motivate one having ordinary skill in the art at the time of invention to modify the composition of Friend for the reasons given above, nor would these secondary references suggest to one having ordinary skill in the art at the time of invention to perform "the kind of experimentation necessary to achieve the claimed composition" of this significantly different battery cathode. *Id.*

For the above reasons, the 35 U.S.C. § 103(a) rejection of claims 1, 9, 10, 12, 19 , 31, 33, and 57 based on Friend in combination with Adams and Anderson should be withdrawn.

Claims 13-18, 20-22, 35, 36, 39-41, 43-48, 50, and 58 were rejected under 35 U.S.C. § 103(a) over Friend, in view of Adams, and further in view of Anderson, U.S. Pat. 4,948,484 ("Anderson"), and further in view of Yagi, U.S. Pat. 4,923,637 ("Yagi"). Claims 13-18 and 20-22 depend from claim 1 and the rejection of these claims should be withdrawn once the rejection of claim 1 based on Friend, Adams and Anderson is withdrawn. Of the remaining claims, claim 35 is independent and claims 36, 39-41, 43-48, 50, and 56 depend from claim 35. Applicants request that this rejection be reconsidered and withdrawn for the same reasons given above because claim 35 includes every limitation included in claim 1.

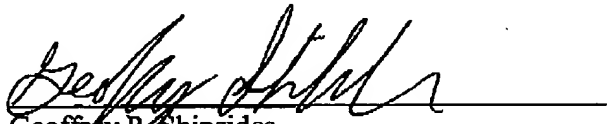
The remaining 35 U.S.C. § 103(a) rejections of dependent claims based on various combinations of references should be withdrawn once the 35 U.S.C. § 103(a) rejection of the base independent claims is withdrawn.

Applicants submit that the claims are in condition for allowance and such action is requested.

Please apply any charges or credits to deposit account 06-1050.

Respectfully submitted,

Date: 9/12/2006



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